

## The Aquifer

The sole source of water for most of the people in Spokane County, Washington and Kootenai County, Idaho, is a high quality underground water body called the Spokane Valley-Rathdrum Prairie Aquifer (Aquifer), and it is also commonly known as the "Rathdrum-Spokane Aquifer." Discovered in 1895, this Aquifer has become one of the most important resources in the region, supplying drinking water to more than 500,000 people. The Aquifer has been studied in considerable detail since 1977, and the results of these investigations have produced programs and regulations designed to ensure this aquifer will remain a valued and protected resource for future generations.

The Spokane Valley and Rathdrum Prairie are ancient geologic features that have, for millions of years, been formed by water flowing downhill from the western slopes of the Rocky Mountains to the Pacific Ocean. During the last Glacial Age (18,000 to 12,000 years ago), and possibly in multiple previous Ice Ages, cataclysmic floods inundated North Idaho and approximately one-third of Washington as a result of the rapid draining of ancient Lake Missoula when ice dams broke (see pages 9 and 10). These floods deposited thick layers of coarse sediments

(gravels, cobbles, and boulders) in this area. The saturated portion of these sediments, where void spaces are filled with water, comprises the Aquifer. Water from adjacent lakes, mountain streams, the Spokane River, and precipitation flows through the flood sediments replenishing the Aquifer.

In the 1970s area residents began to recognize that the Aquifer could easily become contaminated. The highly permeable aquifer boulders, gravel and sands, together with permeable overlying soils, make the Aquifer highly susceptible to contamination from the surface. One of the first important steps to protect the Aquifer was taken by the Environmental Protection Agency when it designated the Spokane Valley-Rathdrum Prairie a "Sole Source Aquifer" in 1978. It was the second aquifer in the nation to receive this special designation. This step further increased public awareness for Aquifer protection and supported the development of special management practices by local agencies. Presently, aquifer protection efforts are managed by Spokane County's Water Resource Program in Washington and by the Department of Environmental Quality and the Panhandle Health District in Idaho.

## Aquifer Facts

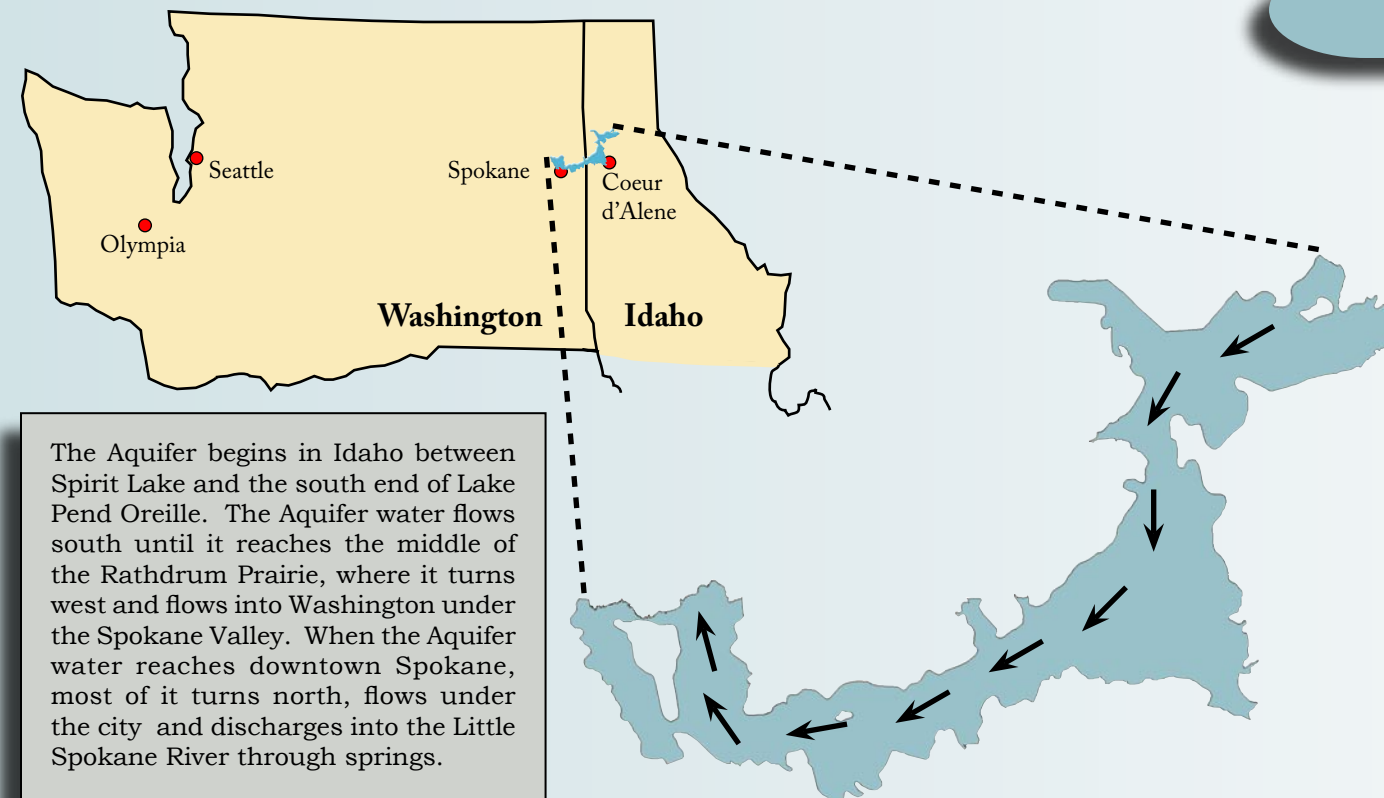
The Aquifer has one of the fastest flow rates in the United States, flowing as much as 50 feet per day in some areas. In comparison, a typical aquifer has a flow rate between 1/4-inch and five feet per day.

The Aquifer sediments range from about 150 feet to 600 feet thick.

The Aquifer covers 322 square miles in two states.

The average daily water withdrawal is about 146 million gallons.

The volume of the entire Aquifer is about 10 trillion gallons, making it one of the most productive aquifers in the United States.



## Water Quality

The first monitoring of the Aquifer water began in October, 1908 in the City of Spokane (see side bar article), but detailed water quality testing in the Aquifer began much later. Since 1977, every three months Spokane County obtains water samples from about 50 wells in Washington. The Panhandle Health District has taken samples from about 28 wells in Idaho since 1974. Testing of these quarterly water samples has shown that:

- ❑ contaminant levels show a direct relationship to human activity,
- ❑ contaminants are mostly located in the top few feet in the Aquifer, and,
- ❑ overall contaminant levels have increased since 1977.

This monitoring suggests that human activities on the land surface over the Aquifer are deteriorating the Aquifer water quality. Contaminants carried to the Aquifer originate as stormwater, septic tank leachate, fertilizer leachate, leaking underground storage tanks and other sources that percolate downward from the surface. Even though contamination has reached the Aquifer, the Aquifer water quality remains very good.

## Water Supply

Newspaper articles from the 1890s and 1910s relate that area residents believed the Aquifer was an "inexhaustible supply of pure water." The belief that the Aquifer was unlimited continued until the early 1980s when the U. S. Geological Survey presented the results of a flow model for the Aquifer. The model found that:

- ❑ the daily Aquifer flow at the Washington-Idaho border was about 258 million gallons,
- ❑ total Aquifer recharge was about 650 million gallons per day,
- ❑ the Aquifer is a reservoir with storage capacity of 10 trillion gallons,
- ❑ the average daily water withdrawal is about 146 million gallons, and
- ❑ the peak summer daily withdrawal is 450 million gallons.

Some studies and models suggest that during periods of high water demand we may be using a large percentage of the Aquifer flow. Currently the available supply is adequate to support area growth for some time, but the supply is not inexhaustible. In 2004 the U.S. Geological Survey began collecting data in Idaho and Washington as part of a new multi-year Rathdrum-Spokane Aquifer study.

## SPOKANE'S WATER PUREST IN WORLD

### City Bacteriologist Frank Rose Reports Results No Colon Bacilli Found

Showing the Spokane water supply purer than the average of American cities, Frank Rose, city bacteriologist, has made a report of tests from the city well made monthly since last October. The tests are simply counts of the number of bacteria found in a cubic centimeter of water.

The average count shows only seven or eight germs in that amount of water. The test was made from water taken from the drinking fountain at Howard street and Riverside avenue or from water from a faucet in the Rookery building. Speaking of his tests, Dr. Rose said:

"It can be said that there is no city in the world that has a better water supply than Spokane. Water which shows 100 germs in a cubic centimeter is considered comparatively pure and drinkable. I made from four to eight counts monthly since last October, and the counts in any one month was 17 bacteria, while the tests last month showed 15 bacteria in eight tests, less than two each.

"In April, 1908, I made tests of the river water from which Spokane got its drinking supply at that time. I took water from the place where the Coeur d'Alene sewer emptied into it and another sample from a place about 500 feet below the outlet of the sewer. In both cases the number of bacteria was so great as to be practically uncountable.

"In contrast to this is the practical purity of the water since last October. Special care was taken to make tests for colon bacilli, which show the presence of sewage, and in no case was there a single trace."

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